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ABSTRACT

A study researched the impact of the portfolio development process as an instructional strategy that promotes increased critical thinking, organization, communication, and self-reflection abilities. The inquiry began with a case study of eight adult learners representative of the student population of a nontraditional undergraduate program with a portfolio component. Of 1,227 students, 348 responded to a 24-question survey using a 4-part Likert-type scale to assess students' portfolio experiences. Findings indicated, after developing a portfolio, adult students expressed a change in their understanding of their abilities and of themselves; gained learning competencies in enhancement of communication and organizational skills, a deeper reflective process, and greater understanding of how they accomplished what they did in their personal and professional lives; and better understood the role of work in their lives. Students valued the constructs of leadership/personal learning and of work-related learning, their respective survey items, and the learning obtained from engaging in the portfolio process. Findings indicated the portfolio's potential as an instructional tool to identify prior learning and engender increased competencies in many areas, including skills in organization, writing, critical thinking, and self-reflection. (Appendixes include 32 references, survey, and survey results.) (YLB)

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What Employers Want: How Portfolio Development Fosters Leadership and Critical Thinking in the Workplace

Introduction

Accountability for educational quality is an exchange among researchers, learners, program developers, faculty and employers who all benefit from effective instructional strategies that promote learner competencies. Accordingly, educational practice can be improved by inquiry that lends itself to exploring the perspectives and concerns of multiple stakeholders within and without the academy. In accord with the theme of AERA 2003, "Accountability for Educational Quality: Shared Responsibility," this paper describes and explains the findings of a cross-sectional survey study of adult learners who indicated that they increased their organization, communication, critical thinking, self-reflection abilities and understanding of the workplace as a site of learning from developing an experiential learning portfolio based on their careers. The portfolio instructional process served as a "reflective bridge" between the learner, the academy and the workplace and augmented competencies important for their academic and career success (Brown, 2001).

Background

One of the most sought after skills in the workplace today is that of reasoning and thinking, often referred to as critical thinking (State of Florida Employers Survey, 1996). Leadership, at all levels of employment, is dependent on critical thinking and communication skills. These are key elements to a holistic, systems-approach mind set necessary to meet the myriad of challenges of a global economy (Drucker, 2001; Senge, 1990).

To achieve this type of leadership it is imperative to educate students in the areas of critical thinking, communication and reflection. Holistic leadership in the workplace, the community and society combines "reflection in and on action" (Argyris & Schon, 1978) with "practice" in the tradition of Freire's (2000) *praxis*. Moreover, Freire's ideas on education as a shared process that liberates and

Greenleaf's (1977) precepts on "leader" as servant necessitate a fundamental understanding of the self and others through critical thought, reflection and communication.

Conceptual Framework

Several of Paul's (1990) tenets in his critical theory education model of interdisciplinary synthesis that engage students in the analysis "of issues, problems, and concepts" (p. 24) in a holistic fashion (McCrink, 1998) correspond to portfolio development in a number of key ways. For example, his model of an educated person whose experiences are analyzed and organized by critical thought parallel the portfolio development process, which necessitates self-reflection, analysis, organization, evaluation and communication of prior learning in the workplace. Moreover, the relationship of basic skills like reflection to writing to thinking is evinced by students' responses to their portfolio experiences:

> The insight gained from [my] portfolio helped me to see, as the slogan goes, "You've come a long way baby!" in my accomplishments, achievements, [and] my development. A degree with a portfolio makes you assess your professional life; without a portfolio, you just know your academic strengths, but you don't know your professional [abilities] and strengths…. I used to reflect [on occasion] because you have to do that in order for you to know where you are and where you are going. As I said, I reflected once in awhile because, I guess, every individual will do that—be concerned with where they have been and where they are going. But I never had to write anything about what I've done and the portfolio has done that for me. By writing about me and knowing where I've been and [what] I've done to in order to be who I am now, the portfolio did something special for me. (Brown, 1999, pp.112, 130)

Finally, Paul's view of knowledge as holistic encompassing the learner's cognitive and affective domains, as noted by humanist psychologists (Maslow, 1970; Rogers, 1983), is congruent with descriptions of learning in students' portfolios. The portfolio development process engages students, often for the first time, in rigorous reflection on and expression of their real-life experiences and the learning derived from them (Brown, 2001; Brown, 2002).

In accord with Paul's views are those of Mezirow (1981,1996) and his Associates (1990) on the transformative aspect that can take place within individuals who engage in critical reflection, a type of critical thinking turned inward. Here the portfolio serves as a mechanism to foster Mezirow's ideas on the transformative nature of self-reflection. The context of a constructivist leadership era—one framed

by a plethora of theories that have emerged based on a global and salient mandate for change—calls for continuous reflection toward a "re-culturing" process, namely, the capacity to critically assess new ideas and implement the appropriate ones within the organization, vis-à-vis the pervasive infrastructure (Fullan, 2001). Organizational change theory today (organizational transformation) presents an "action company" paradigm where "every person must think for himself or herself and do the right thing" (French, Bell, & Zawacki, 2000, p. 132).

Kolb's model ((Kolb, 1984; Baker & Kolb, 1990) on "experiential learning," which includes four stages—"concrete experience," "reflective observation," "abstract conceptualization," and "active experimentation"—aims at holistic learning and represents the essence of the portfolio development process as students must move away from fragmentation and develop an interdependency between theory and real world experience. Inherent in this model is one of Paul's "critical theory" tenets, i.e., "the view of knowledge" as systemic and holistic (Paul, 1990, p). Thus, the schemata for success in today's workforce delineates the integration of leadership practices, vis-à-vis change orientation modalities, that can only be achieved through a critical thinking process anchored in reflection and hands-on learning—the essence of portfolio development.

Methodology

A multi-method research design was utilized to study the impact of the portfolio development process as an instructional strategy that promotes—among other outcomes—increased critical thinking, organization, communication and self-reflection abilities.

Qualitative Inquiry: The inquiry began with a case study of eight adult learners from different ethnic, gender and age groups that were representative of the student population of a nontraditional undergraduate program with a portfolio component (Brown, 1999). The researcher read each student's completed portfolio prior to the interviews. Field notes and a researcher's journal were also kept as points of additional analysis. The data was analyzed according to grounded theory procedures (Creswell, 1998; Strauss & Corbin, 1997). Constant comparative analysis and open coding of each data

source was performed throughout the collection and analysis periods. This process led to the recognition of themes and sub-themes from the portfolios and the interviews. The researcher then employed axial coding between sources collapsing and connecting the initial themes (Creswell, 1998).

Quantitative Inquiry: Based on the case study findings, in the spring of 2000 a 24-question survey using a four part Likert type scale to assess students' portfolio experiences was created (Appendix A). It covered three areas of interest for the researchers:

1. Efficacy of Instructional Materials in Development Process: instructional modules, seminar, and advisors' assistance in portfolio development (questions 1-7).

2. Attainment of Personal Learning: increase in self-esteem, self-knowledge, self-confidence, professional pride, motivation, accomplishment and application (questions 13-15 and 21-22).

3. Recognition of Leadership/Personal Learning: augmentation of organization, critical thinking, communication skills and the value of mentors and of the work place as a venue for learning and career development (questions 9-12, 16-20).

A total of 1,227 students received surveys. The response rate (i.e., usable returned surveys) was 348 or 29% over nine terms. Demographics of the respondents (Appendix B) are consistent with the overall gender, ethnicity, site location, age and degree program for the general student population at the school surveyed. Accordingly, the non response rate for the population is not considered bias. Item-analysis (pp. 5-8) and descriptive statistical analysis (Appendix C) using SPSS was calculated for each survey question and a linear regression analysis of critical thinking, communication, organization and writing was preformed (pp. 12-15).

The qualitative and quantitative findings presented below deal primarily with those questions connected most closely to portfolio development as a teaching and learning strategy that, similar to other academic strategies for adult learners, can foster leadership and critical thinking at work.

Findings

Qualitative

The qualitative analysis resulted in the identification of major findings, three of which are relevant for this discussion:

1. After developing a portfolio, students expressed a change in their understanding of their abilities and of themselves. The components here are (a) the recognition of all they have accomplished to date and (b) a sense of self-discovery and of personal empowerment to achieve their professional and educational goals.

2. After developing a portfolio, adult students gained learning competencies in several areas. Three intertwining components are presented here: (a) the enhancement of communication and organizational skills and (b) the deepening of the reflective process and c) a greater understanding of how they accomplished what they did in their personal and professional lives. Before portfolio development they were primarily "doers" who did not always reflect on how they got from place A to place B in their lives (Brown, 1999, pp. 109-110)

3. After developing a portfolio, adult students better understood the role of work in their lives. Three components flowed from this theme: (a) the value of learning through work experiences, (b) the role of mentors in one's life and the students' role as mentor, and (c) the value of teamwork.

Quantitative

During last nine terms (summer of 2000 through fall 2002), the researchers distributed a survey instrument to recent graduates of a nontraditional undergraduate degree program who developed an experiential learning portfolio based on their professional work experiences. As noted earlier, the survey consisted of 24 questions developed from the major themes of the above noted qualitative study on portfolios. Survey questionnaires were mailed to all students (1,227) who had graduated and successfully completed a portfolio. The N of this sample is 348, representing an overall return rate for the nine terms of 29 %. The questionnaire contained three groups of questions measuring three different constructs (Instructional Materials, Personal Learning and Work-Related Learning).

Item-Analysis.

Item Analysis, using the reliability analysis procedure, (Green, Salkind & Akey, 1999, pp. 313-326) was used to analyze the overall conceptual reliability of items within each group of questions

(coefficient alpha); to examine the relationship of each item to the group total with the item removed from the total (corrected item-total correlation) and to gain a sense of the independent contribution, in percent, of each item to the total (squared multiple correlation). The means of each item were also calculated to assess relative rank and position within each construct group. Means were calculated for each item based on a four choice (1-4) scale of: strongly disagree, disagree, agree, strongly agree. For the means, the higher the number, the more valued the item. For the purpose of this paper, item analysis of the following two constructs are explored:

1. The first group of questions, called Leadership/Personal Learning (Table 1), examined learning outcomes for students that were related to personal or self development. *Increased organization, communication, critical thinking, self-esteem, self-knowledge, and self-confidence* are examples of these eleven items.

2. The second group of questions, designated Work-related Learning (Table 2), assessed how much students believed that completing the portfolio process transferred learning to their work environment. Sample items such as *recognition of mentors, value of work in career development, value of work in learning* reflect three of the six items from this construct.

Item analysis (using the reliability analysis procedure) was used to assess the conceptual reliability of items within each group of questions (coefficient alpha); to examine the relationship of each item to the group total with the item removed from the total (corrected item-total correlation) and to gain a sense of the contribution, in percent, of each item alone to the total (squared multiple correlation). Item means were also calculated to assess relative value and position within each group. Reported means represent a four choice (1-4) scale: strongly agree, agree, disagree, strongly disagree.

The Construct of Leadership/Personal Learning (Table 1): Leadership/Personal Learning items closely connected to Work-Related Learning consisted of eleven questions related to personal/self-oriented learning outcomes following completion of the portfolio process. Interpretation of the **leadership/personal learning** construct indicates that according to the reliability analysis, students reported *self-confidence* as having the highest overall relationship to the construct of leadership/ personal learning. The reliability analysis further suggests that *self-knowledge, self-esteem,*

Table 1. *Reliability Analysis of Portfolio Follow-up Survey Items for the Construct of Leadership/Personal Learning and Work Related Learning*

	Item	Corrected Item-total Correlations	Squared Multiple Correlations	Means
1.	Increased my self-confidence	.82	.82	3.05
2.	Increased my self-knowledge	.80	.71	3.30
3.	Increased my self-esteem	.80	.85	3.08
4.	Increased my critical thinking	.78	.70	3.18
5.	Increased my self-reflection	.78	.69	3.42
6.	Increased my professional pride	.77	.68	3.39
7.	Increased my written communication	.76	.71	3.15
8.	Increased my organizational skills	.76	.69	3.18
9.	Increased my motivation for future goals	.73	.57	3.31
10.	Increased my self-empowerment	.70	.53	3.24
11.	Increased my sense of accomplishment	.60	.41	3.70

Coefficient Alpha = .94

critical thinking, self-reflection, pride, writing, and organizational skills, represent moderately high relationships with the overall construct of personal learning. The Coefficient Alpha for the personal learning construct is .94, a very high level of reliability.

In terms of means alone, *accomplishment* (3.7) was the highest of all items suggesting this item was more highly valued than some other items. Means for a second group of items, *self-reflection* (3.4), *pride* (3.4), *motivation* (3.3), *self-knowledge* (3.3) and *empowerment* (3.24) were a second group in rank, reflecting a strong sense of importance by the students to these items. The remaining item means ranged from 3.18 to 3.05 representing a moderate value to respondents.

The Construct of Work-Related Learning (Table 2): Work-related Learning consists of six questions related to transfer of learning from the portfolio preparation process to the work environment.

Table 2. *Reliability Analysis of Portfolio Follow-up Survey Items for the Construct of Work-Related Learning*

Item	Corrected Item-total Correlations	Squared Multiple Correlations	Mean
1. Increased my understanding of value of work experiences in learning	.76	.64	3.39
2. Increased my understanding of role of work in my career development	.76	.60	3.29
3. Increased my understanding of role of work in adult my adult development	.75	.64	3.35
4. Increased my appreciation of learning from community activities	.73	.55	3.14
5. Increased my recognition of mentors in my professional life	.72	.53	3.16
6. I applied what I learned from developing a portfolio to my work and personal life	.70	.51	3.19

Coefficient Alpha = .90

Interpretation of the **work-related learning** construct indicates that three items, *value of work in learning, role of work in career development, and role of work in adult development,* were the most highly associated items with the overall construct. The overall level of these correlations, is moderately high. The items *learning from community activities* and *learning from mentors,* represented the second highest in strength of association with the work-related construct. *Applied portfolio learning to work and personal life* represents the third highest level of relationship to the overall construct. Coefficient Alpha for this construct is .90, a very high level of reliability.

In terms of means alone, *increased the value of work in learning* (3.39) was the highest in rank along with *role of work in adult development* (3.35) suggesting these two items were of high value to respondents. The next highest in rank was *role of work in career development* (3.29), also suggesting a high value by respondents. All remaining items had means from 3.19 to 3.14 suggesting a moderately high value to respondents.

Overall, students valued the constructs, their respective items, and the learning obtained from engaging in the portfolio process. Though the second construct has less strength of relationship than the first construct, each of the constructs held up well to measures of reliability with each achieving over .90 or greater. This suggests that the measures were conceptually sound, and the portfolio process delivers valued learning outcomes.

Descriptive Statistical Analysis. The findings for the descriptive statistics (NB: N=358 as here 10 nearly completed responses were included) of the 24 survey questions (Appendix C) support the findings in the qualitative study. For the purposes of this paper we will concentrate our discussion on survey questions #9 *(increase in organization)*, #10 (*increase in writing*), #11 (*increase in critical thinking*), and #12 (*increase in self-reflection*). In the area of an *increase in organization skills*, 83.7% of respondents strongly agreed or agreed that the portfolio development process increased their skills in this area. The survey responses echoed the pre-survey development interviewed students, one of whom expressed his increase in organization skills this way:

> Well reminiscing, it [developing a portfolio] reinforced organization, definitely because it made me organize what I wanted to put on paper. It also helped my writing, but the biggest thing was probably organizational skills. I mean it made me sit down and think of what I wanted to do before I actually did it. Reading the directions and looking at the [instructional] modules that stated this has to go from present to past not past to present, etc., made the process heavy on organizational skills for me. (Brown, 1999, p.164)

The remaining 16.3% of students disagreed (15.3%) or strongly disagreed (1.%) concerning an increase in their *organization skills* (see Appendix D for all Disagreed and Strongly Disagreed). Why is it that these students did not experience an increase of skills in this item? Based on the researchers'

experience with thousands of portfolios, this may be due to the fact that some students possess strong organizational competencies before portfolio development. Moreover, there are a percentage of portfolios prepared that lack the rigor necessary to produce this result.

In regard to an *increase in writing skills*, 82.23% of the respondents strongly agreed or agreed that they increased as a result of creating a portfolio. Again, the responses were in accord with the pre-survey interviewees, one of whom said:

> … my writing became much better because I would read it so many times and then I would not read it for three weeks, and then I would come back and read it, and go, "What was I thinking?" And it made me check my grammar—it made me go back to English 329, my little book and my notes. Then I'd remember, "She says you can't do this," and you actually look it up and see what it was because it was so important, you know, because it was you—no one else [could] help you because this was your life, this was what you did. What you accomplished, I think, is how your portfolio would be at the end. (Brown, 1999, p. 165)

Another interviewed student noted:

> [Since writing the portfolio] I am beginning to journal my accomplishments at work. Because it just means so much more once you put it in writing. I have always been one to document a lot at work. But not in a format like a journal where you could actually put dates and times and that you could actually put it as a perspective and build something like "I started here, and this is what this developed into, and this is what it turned out to be at the end." So I started out right after I finished my portfolio last semester. That is where I started this journal at work, and I have been doing it ever since. I've enjoyed it. (Brown, 1999, p.130)

Here again 17.73% of students disagreed (16.52%) or strongly disagreed (1.48%) about an increase in *writing skills*. As in the previous comment, certain students bring to the portfolio process a high degree of writing ability honed through years in the workplace. Also, some students submit portfolios that do not reflect a proficiency with English.

Survey responses to question #11, an *increase in critical thinking skills*, revealed that 83.24% of respondents strongly agreed or agreed. In regard to critical thinking needed on-the-job a supervisor who was interviewed in the first study stated:

> Well, when you try to solve problems or at least that's how I think I always look back to past situations and how problems are solved. As a rule I wouldn't say that all problems are solved by back problems you've dealt with because sometimes you have to have new and innovative ways to approach [problems]. But I guess I always reflected back to see how I handled this type of situation to see if I could apply it again or if something different had to be done. (Brown, 1999, p. 131)

The need to think critically about one's professional career during the portfolio development process and the multiple benefits derived from it was by explained by another interviewee:

> This gave me a blueprint of how I accomplished [moving] from a waste service clerk to where I'm at now. People used to come to my office and say, "Oh, you're so lucky, you just get promoted every time you turned your head." Then, at times I started saying, "Well, maybe I was lucky, maybe I don't really know that much." But when I sat down and wrote down how I went through the [training] courses, how I learned this, how I had to learn that, how I helped integrate all of it together and made the decisions about what how I was going to do things, because when I started writing my portfolio was right after I got my new position. It's really overwhelming that I was like, starting to have self-doubts, that I couldn't do [the new job], but after completing my portfolio, it was like, I did that so I know I can do this. It may take some time and I may make some mistakes, but that's okay because I know in the end I'm going to do the best I can do and my best is great. It gave me the confidence to know that in the job that I have now, I'm going to be fine. (Brown, 1999, pp. 162-163)

The remaining 17.76% of students indicated disagreed (15.36%) or strongly disagreed (2.64 %) in regard to an *increase in critical thinking skills*. Undoubtedly, a number of students were very much aware of utilizing critical thinking in their profession regularly and therefore did not perceive an increase in their ability. A government worker, who participated in the pre-survey interview study, noted that he was in the habit of thinking critically on the job:

> Well, when you try to solve problems or at least that's how I think I always look back to past situations and how problems are solved. As a rule I wouldn't say that all problems are solved by back problems you've dealt with because sometimes you have to have new and innovative ways to approach [problems]. But I guess I always reflected back to see how I handled this type of situation to see if I could apply it again, or if something different had to be done.

The survey response to question #12, *increase in self-reflection,* showed 93.24% of respondents strongly agreed or agreed. An interviewee expressed it this way:

> I think I have [always had] a systematic way of doing things that I never put a value on until I had to sit down and reflect on it and systematically go through it in order. When someone comes in [your office] and sees what you're doing—right in the middle of it—and it's not quite finished yet—you have every detail here and you're real good at remembering it. Well, it makes you realize that, "Hey, you know, I can do it, I have systematically set up a way to do this." I guess I've always done it before in the past, but reflecting upon it and actually giving value to it is what I was able to do by doing the portfolio. I just never thought about it. I did it but never gave it any thought. (Brown, 1999, p.131)

Another interview participant linked reflecting and writing in her response. Developing the

portfolio brought her to a deeper level of personal awareness:

> I used to reflect [on occasion] because you have to do that in order for you to know where you are and where you are going. As I said, I reflected once in awhile because, I guess, every individual will do that—be concerned with where they have been and where they are going. But I never had to write anything about what I've done and the portfolio has done that for me. By writing about me and knowing where I've been and [what] I've gone to in order to be who I am now, the portfolio did something special for me. As I said, it was the first time that I was writing something about me. (Brown, 1999, p. 130)

Still another spoke of professional awareness through reflection:

> I think, in my jobs, I was just moving as opposed to reflecting. If I did reflect, it was rather quickly because I was into performance, so I didn't employ that reflective process. But through the portfolio development it brought back the memories of the experiences, and it has put more credibility on what I'm doing. It has started a process of me being more aware of what I'm doing on the job. (Brown, 1999, p. 131)

It is not surprising to the researchers that only 6.76% of students surveyed disagreed (5.66%) or strongly disagreed (1.10%) with this concept. Portfolio development requires intense self-reflection in order to identify, analyze, evaluate and communicate prior learning that can be equated to academic knowledge.

The utilization of qualitative inquiry to guide quantitative research in this study helped to support the research findings both in the case study and survey. The interview data was indispensable in developing the survey questions. Likewise, the survey was able to reach a greater population of adult learners with specific questions about their portfolio experiences. Though this paper focuses on the elements related to critical thinking, communication, organization and self-reflection, the qualitative and quantitative findings both support increased abilities in all the survey questions. Given the high percentages of responses that strongly agreed or agreed, the descriptive findings further support consideration of portfolios as a viable instructional strategy for adults to increase performance through increased awareness and competencies in institutions of higher learning and in the workplace.

Linear Regression Analysis of Leadership/Personal Learning Survey Items. Several high correlations between Leadership/Personal Learning items were evident (Tables 3 and 4). This was investigated further by running a multiple regression analysis on two groups of these particular variables. The first group (Table 3) involves the extent that *writing, organizational skills, self-confidence and self-reflection* predict *critical thinking*. It was posited that the predictor group would be

Table 3: *Bivariate and Partial Correlations of the Predictors with Critical Thinking for ACE Portfolio Follow-up Survey*

Predictors	Correlation between each predictor and Critical Thinking	Correlation between each predictor and the Criterion, Critical Thinking, controlling for all other predictors
Improved Writing	.78*	.45*
Improved Organizational Skills	.72*	.21*
Improved Self-Confidence	.64*	.18*
Improved Self-Reflection	.63*	.21*

*$p<.05$, $R = .83$, $R^2 = .69$, $N = 348$, $p < .05$

revealed in the predictor variable by analyzing item responses on the portfolio follow-up survey.

What the data suggests for *critical thinking* is that the item of *writing* correlates very highly with the criterion. This is in accord with Paul's ideas and others who equate writing and with clarity of thought (Dominice, 1990; Emig, 1977; Weinberg, 1993). *Writing* in this analysis specifically contributes to about 20 percent of the variance for *critical thinking* when all other variables are excluded (partial). *Organizational skills* contributed about 5 percent to the variance of *critical thinking* when other variables are controlled and has a high correlation in the overall model used. Although *self-confidence* has a moderately high correlation with *critical thinking* in the model, it has a low (3%) independent contribution to the criterion. *Self-reflection* on the other hand, has a moderately high correlation with *critical thinking* and a slightly higher partial correlation of 4 percent.

Statistics for the model include an overall correlation coefficient of .83 and an R squared value of .69, indicating that the combination of the predictor variables accounted for 69 percent of the overall variance in the item of *critical thinking*. These statistics were significant at the .05 level, as were all correlations and partial correlations. Overall, improved *writing* is the overwhelming contributor to the criterion of *critical thinking*. Both of these variables involve cognitive processing, decision making, and making things clear.

The next group analysis (Table 4) takes a different perspective and looks at the possible predictors for the criterion of writing. This group includes several other variables that were highly correlated compared to the analysis above. The predictors for this group were critical thinking, organizational skill, self-knowledge, and motivation. It was suggested that this group may have some relationship to the item and concept of improved writing.

The data from Table 4 suggests that *critical thinking* is highly independently correlated to the survey item of *writing*. As compared in Table 3, here in the reverse, *critical thinking* independently contributed 20 percent to the overall variance of writing. As expected, this was the same percent as in the previous analysis (see Chart 1, page 14a). *Organizational skills* have a high correlation to writing

Table 4: *Bivariate and Partial Correlations of the Predictors with Writing for ACE Portfolio Follow-up Survey*

Predictors	Correlation between each predictor and Writing	Correlation between each predictor and the Criterion, Writing, controlling for all other predictors
Critical Thinking	.78*	.44*
Improved Organizational Skills	.76*	.40*
Improved Self-Knowledge	.60*	.09
Improved Motivation	.60*	.14*

*$p<.05$, $R = .84$, $R^2 = .70$, $N = 348$, $p < .05$

in the overall model (.76) and independently contribute 16 percent to the total writing variance. Although self-knowledge has a moderately high relationship to writing in the overall model, its

Chart 1: ***Bivariate correlations of predictors for Critical Thinking and Writing Criterion in ACE Portfolio Follow-up Survey: 2000-2002***

contribution independently is not significant. Motivation, also has a moderately high overall correlation to the criterion, however, its independent contribution is only 2 percent.

Statistics for the model include an overall correlation coefficient of .84 and an R squared value of .70. These values are high, indicating that the combination of predictor variables in the model accounted for 70 percent of the overall variance in the item of *writing*. These statistics are significant at the .05 level. Both *improved critical thinking* and *improved organizational skills* accounted for the most variance in the criterion item of *writing* with 20 and 16 percent, respectively. Other variables in this group contributed very little to the overall model and independently. It would appear that a sense of improved writing heavily involves the problem solving and discerning skills of *critical thinking* coupled with a sense of improved ability to organize and work in group settings.

Table 5: *Means, Standard Deviations, and Inter-correlations for the Leadership/Personal Learning Items from the ACE Portfolio Follow-up Survey*

Variable	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1.Empowerment	3.24	.74	---	.66**	.59**	.58**	.59**	.55**	.54**	.56**	.55**	.59**
2.Organizational skills	3.18	.75		---	.76**	.72**	.59**	.58**	.58**	.59**	.61**	.57**
3.Writing	3.15	.73			---	.78**	.57**	.61**	.60**	.61**	.52**	.60**
4.Critical thinking	3.18	.73				---	.63**	.64**	.61**	.64**	.56**	.60**
5.Self-reflection	3.42	.64					---	.76**	.64**	.64**	.72**	.56**
6.Self-knowledge	3.30	.71						---	.73**	.74**	.68**	.60**
7.Self-esteem	3.07	.81							---	.91**	.62**	.60**
8.Self-confidence	3.05	.83								---	.68**	.66**
9.Pride	3.39	.67									---	.65**
10. Motivation	3.31	.74										---

** $p < .05$

Analysis of Leadership/Personal Learning Items Inter-correlations: Table 5 below provides the means and inter-correlations of personal learning items from the Summer 2000-Summer 2002 ACE portfolio follow-up survey. All correlations are significant at the .05 level. What is interesting are those correlations .73 and above. The highest relationship is that of *self-esteem* vs. *self-confidence* (.91) which we might expect, given that these concepts are likely to be strongly psychologically overlapping. *Writing* and *critical thinking* are also highly related (.78), also suggesting psychologically overlapping concepts. *Writing* and *organizational skills* (.76) and *Self-knowledge* and *self-reflection* (.76) are pairs that are both moderately highly correlated, again suggesting aspects of each in common with the other. Lastly, *self-knowledge* and *self-esteem* (.73) and *self-knowledge* and *self-confidence* (.74) are two pairs related with similarly moderately high correlations. It appears that the three "*self*" survey items are likely to have some shared characteristics suggesting that "self-awareness" in general is a major part of these concepts.

In sum, the qualitative and quantitative findings of this study indicate the portfolio's potential as an instructional tool both to identify prior learning and engender increased competencies in many areas including organizational, writing, critical thinking and self-reflection. This type of knowledge acquisition is important for the academy and the workplace, thus worthy of further investigation.

Discussion

For several decades, the teaching and learning equation has been replete with efforts to integrate critical thinking skills in the much fragmented and didactic realm of instructional strategies that are still the norm in most college and university classrooms. Indeed, the call for a liberal arts education as the ultimate tool that will "give students the strong sense of self and habits of mind and action to become leaders" seems to be beyond the reach of most undergraduate programs (Durden, 2001, p. B20). In addition, those unique leaders who walk across the business and academic divide, such as Rosabeth Moss Kanter, emphasize the need to infuse the humanities perspective and apply the liberal arts context to the business world (Rabuzzi, 2001). College programs that aim at a holistic

view—those that foster interdependency among a myriad of constructs and place an emphasis on identifying those connections between theory and practice—deserve recognition in today's academic platform. Thus, the impetus for this study that provided data that suggests the fostering of critical thinking skills through portfolio development.

In an effort to arrive at critical thinking as the ultimate outcome of the portfolio development process, it is essential to understand its relationship to organization, communication, and self-reflection. Each of these competencies serves to provide the backbone for effective leadership as well as managing change in a postmodern environment that calls for synergy and a multiplicity of elements. Indeed, today's organizational agenda demands "creative professionals" who engage in problem solving and "regularly think on their own" (Florida, 2002, p. 3).

Participants' response rate in the area of organization skills reflect the ability to analyze and synthesize information based on a specific context as students must identify tasks and responsibilities in their respective jobs and then relate these to learning competencies in their portfolios. The need to master organizational skills is reaffirmed in the literature in a variety of fields in high demand such as nursing, where the ability to analyze and synthesize client data to arrive at a diagnosis is evident (Niedringhaus, 2001). The latter task is one of several assessment outcomes used as part of a holistic approach to foster critical thinking skills in a nursing program in addition to specific writing assignments, including care plans and clinical journals (Niedringhaus). At some educational institutions, psychology majors are exposed to the "trait-based" term paper assignment toward engaging in self-reflection through writing that is thought provoking and aims at developing critical thinking (Hittner, 1999). Thus, the role of writing in the critical thinking process is salient.

Clearly, critical thinking is a composite of several tasks—organization, communication, and self-reflection--that coalesce and are embedded in the portfolio development process. In fact, recruiters praise the benefits of the academic portfolio: "The academic portfolio gives an example of independent reasoning and work without complete supervision" (Moody, Stewart & Bolt-Lee, 2002, p.

4). Undoubtedly, independent reasoning, or plainly stated, the ability to think critically serves as the mantra for a holistic approach to leadership in the present revolutionary terrain. Gone are the days where survival of the fittest and formula-driven bureaucracies took precedence. The first decade of the 21st century requires its human capital to look beyond the immediate scenario and develop a heuristic view toward a hybrid model of leadership—one where organization, communication, and continuous self-reflection will promise survival of the business enterprise in a global and fluctuating economy. Indeed, it is the responsibility of colleges and universities to engage and prepare students for transition into the workforce through instructional strategies that promote critical thinking and ensure measurable outcomes toward the national mandate for shared accountability. Adding portfolio development to traditional classroom activities may be one way to increase the connection between the academy and the world of work.

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Appendix A

STUDENT SURVEY SPRING 2002
Thank you in advance for your responses.

	1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree
1. The portfolio seminar gave me a good foundation for developing my portfolio.	1	2	3	4
2. Module #1 on the Introductory Section of the portfolio helped me to develop my Goal Statement.	1	2	3	4
3. Module #2 on the Experiential Learning Resume helped me to understand and list positions/activities that met the criteria for college-level learning.	1	2	3	4
4. Module # 3 on the Documentation helped me to use research and critical thinking skills to understand the differences between primary, secondary, and unacceptable documentation.	1	2	3	4
5. Module #4 on The Learning Assessment Worksheet helped me to use critical thinking and analysis skills to distinguish between experiences (tasks/responsibilities) and learning (competencies).	1	2	3	4
6. Module #5 on The Autobiographical Learning Essay helped me to organize, synthesize, and evaluate my learning from experience in essay form.	1	2	3	4

	Strongly Disagree	Disagree	Agree	Strongly Agree
7. The portfolio advisement sessions I had helped me to develop my portfolio.	1	2	3	4
8. The portfolio development process was valuable to me beyond the credits I received for my portfolio.	1	2	3	4
9. The portfolio development process increased my organizational skills.	1	2	3	4
10. The portfolio development process increased my written communication skills.	1	2	3	4
11. The portfolio development process increased my critical thinking skills.	1	2	3	4
12. The portfolio development process increased my self-reflection.	1	2	3	4
13. The portfolio development process increased my self-knowledge.	1	2	3	4
14. The portfolio development process increased my self-esteem.	1	2	3	4
15. The portfolio development process increased my self-confidence.	1	2	3	4
16. The portfolio development process increased my pride in my professional accomplishments.	1	2	3	4
17. The portfolio development process increased my motivation to achieve future professional and/or educational goals.	1	2	3	4
18. The portfolio development process increased my understanding of the role of work in my career development.	1	2	3	4

	1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree
19. The portfolio development process increased my understanding of the value of work experiences in learning.	1	2	3	4
20. The portfolio development process increased my understanding of the role work played in my adult development.	1	2	3	4
21. The portfolio development process increased my recognition of mentors in my professional life.	1	2	3	4
22. The portfolio development process increased my appreciation of learning from community activities.	1	2	3	4
23. When I completed my portfolio I had a great sense of accomplishment.	1	2	3	4
24. I applied what I learned from developing a portfolio to my work and/or personal life.	1	2	3	4

PLEASE ANSWER THE FOLLOWING: **(USE OTHER SIDE AS NEEDED)**

25. Briefly tell us how you would improve the portfolio seminar.

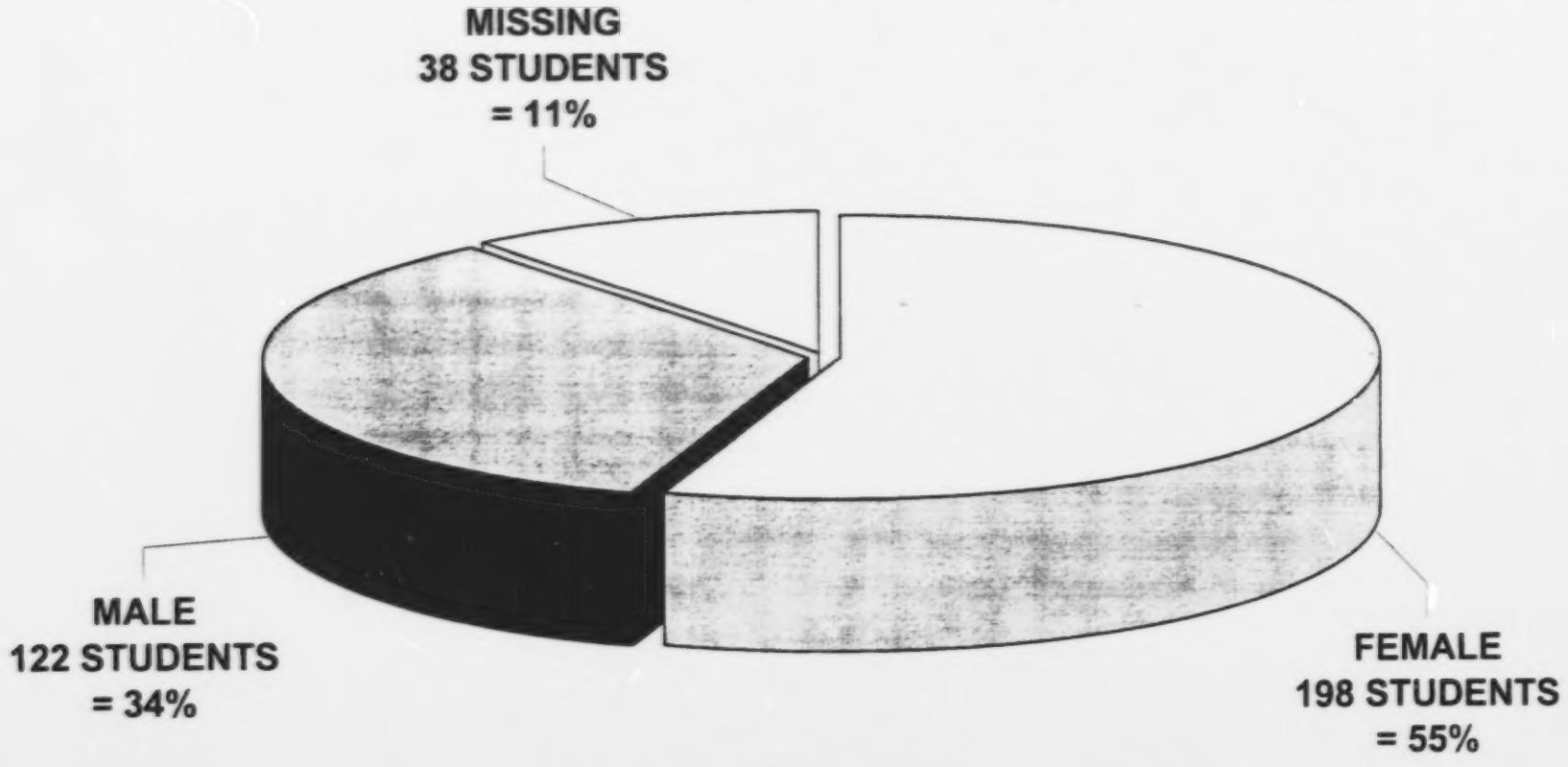
26. Briefly tell us about how you would improve the portfolio instructional modules.

27. Briefly tell us how to improve portfolio advisement.

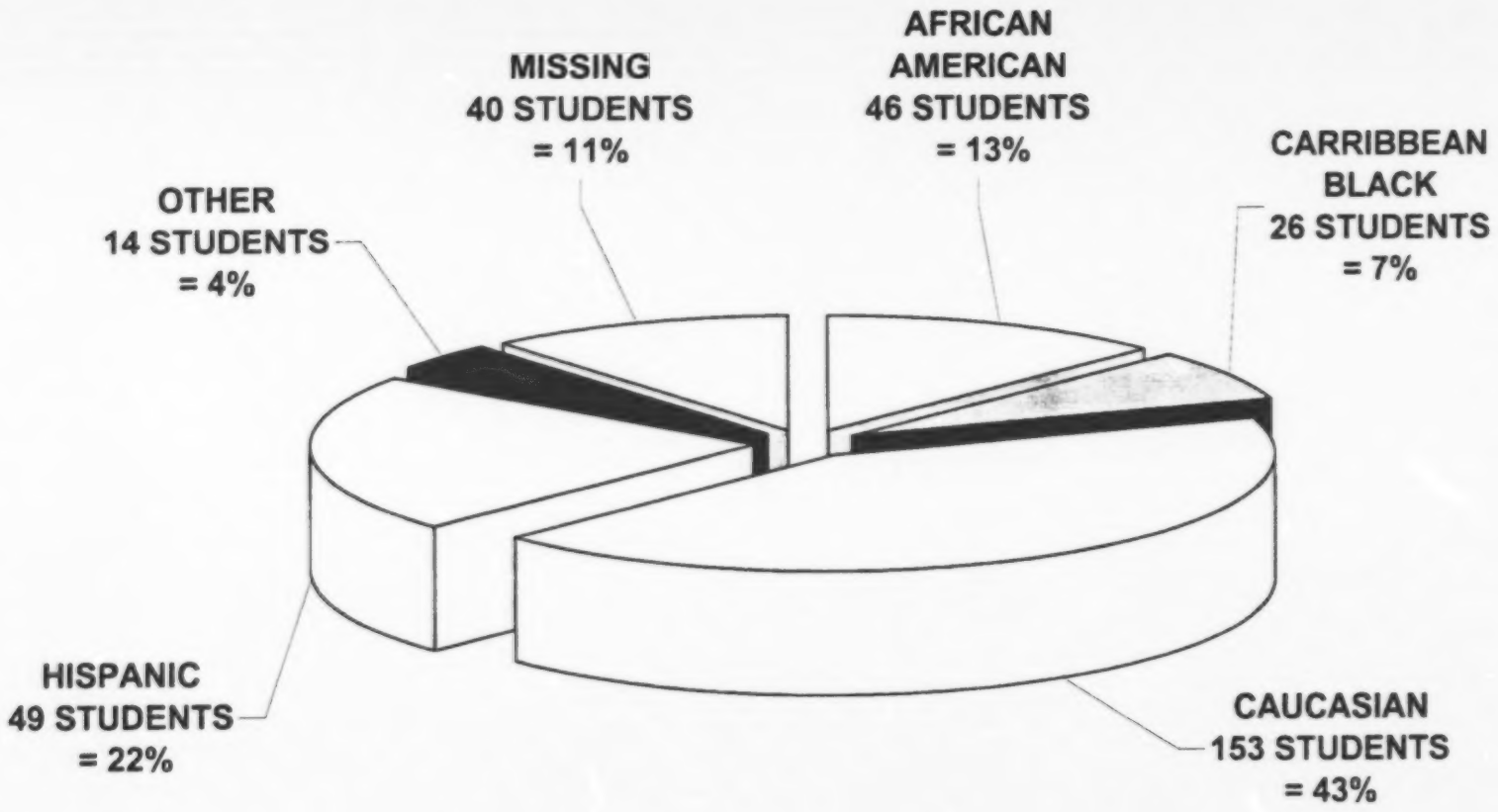
28. Briefly tell us any emotional reaction(s) you may have had (positive or negative) to portfolio development (such as excitement, sadness, happiness, nostalgia, frustration).

Appendix B

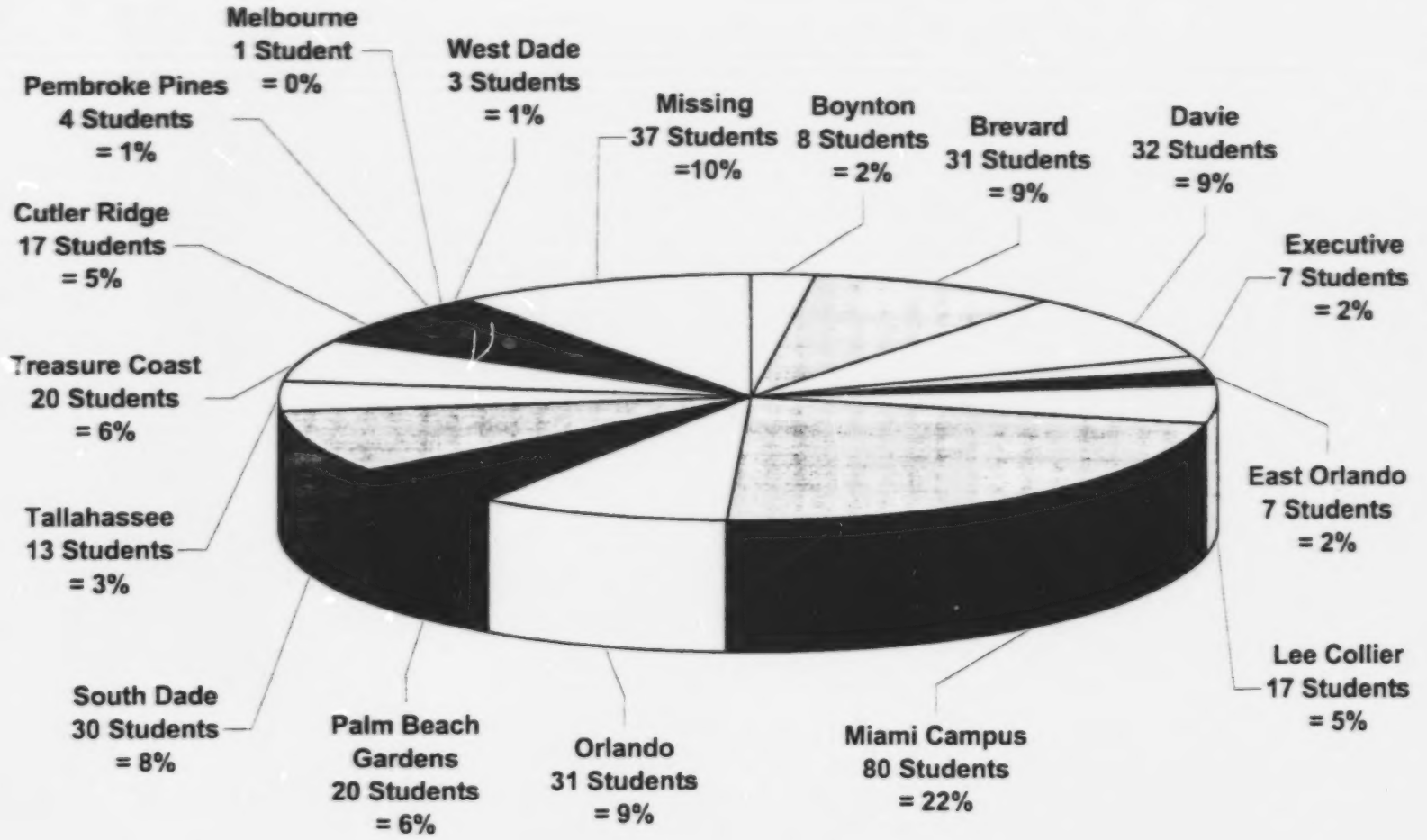
COMPOSITE RESULTS
SUMMER 2000-SUMMER 2002 (9 TERMS) n=358
STUDENT SURVEY
GENDER



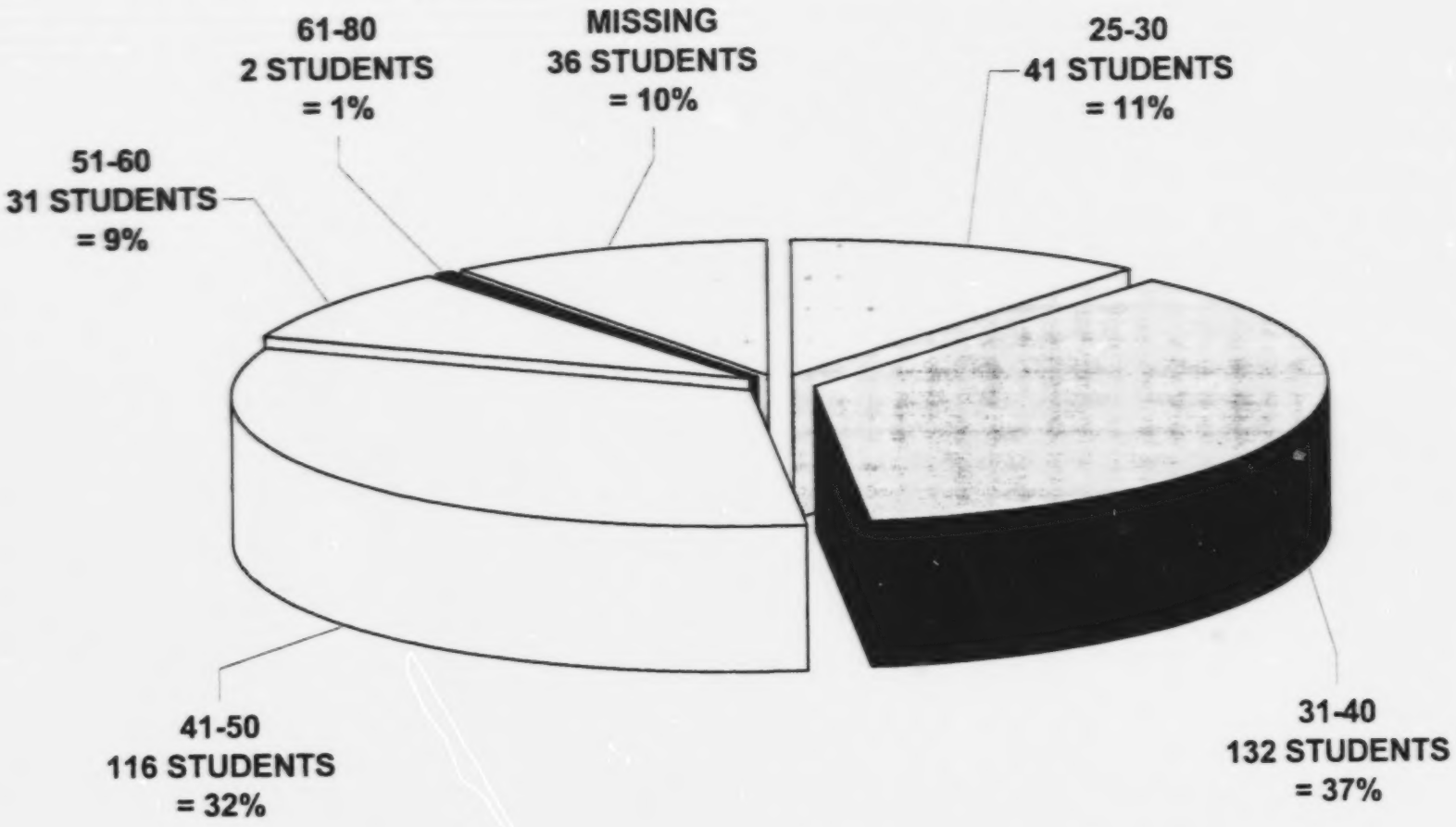
COMPOSITE RESULTS
SUMMER 2000-SUMMER 2002 (9 TERMS) STUDENT SURVEY n=358
ETHNICITY



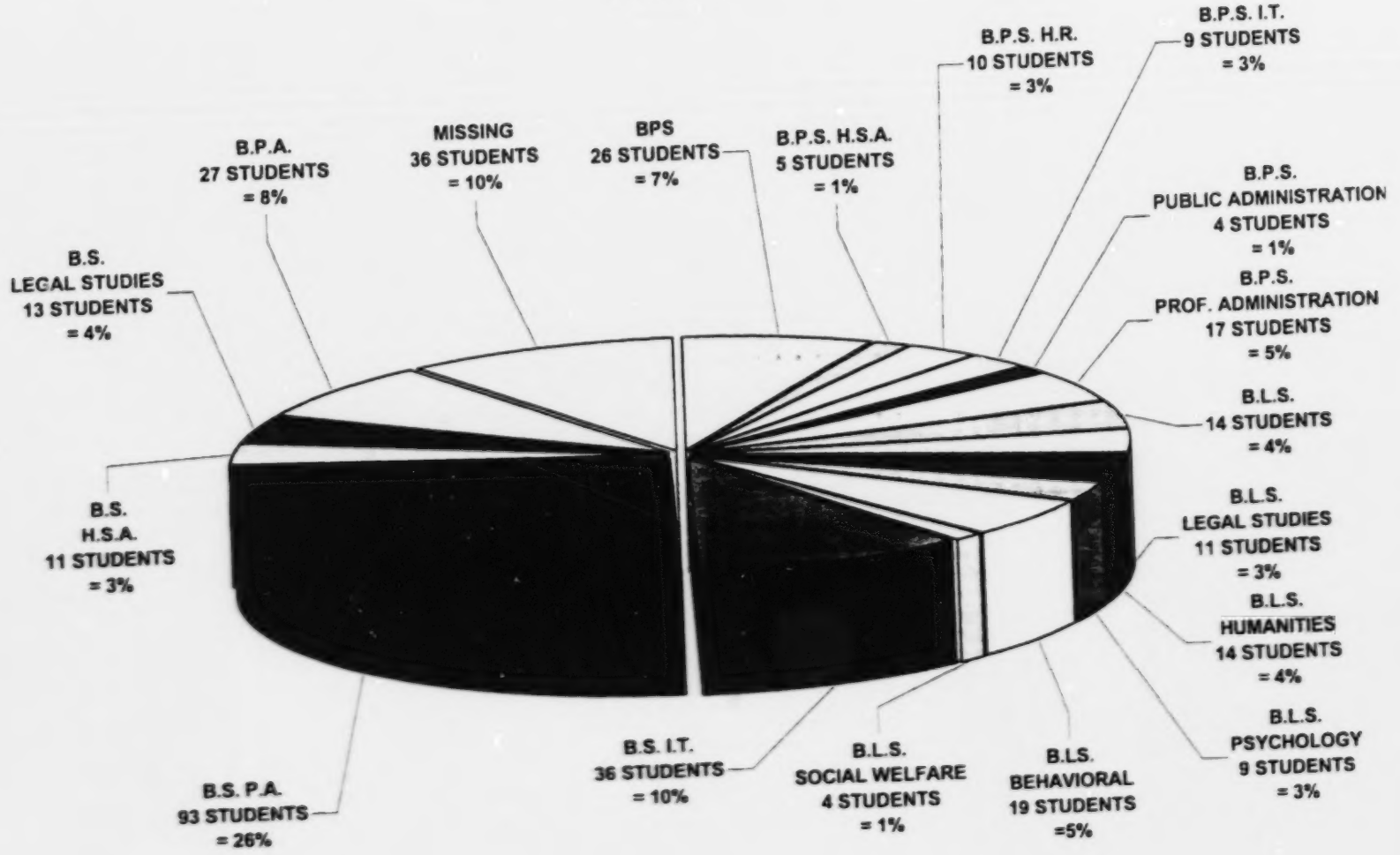
COMPOSITE RESULTS
SUMMER 2000-SUMMER 2002 (9 TERMS) STUDENT SURVEY n= 358
SITES



COMPOSITE RESULTS
SUMMER 2000-SUMMER 2002 (9 TERMS) STUDENT SURVEY n=358
AGE



COMPOSITE RESULTS
SUMMER 2000-SUMMER 2002 (9 TERMS) n=358 STUDENT SURVEY
DEGREES



Appendix C

COMPOSITE RESULTS
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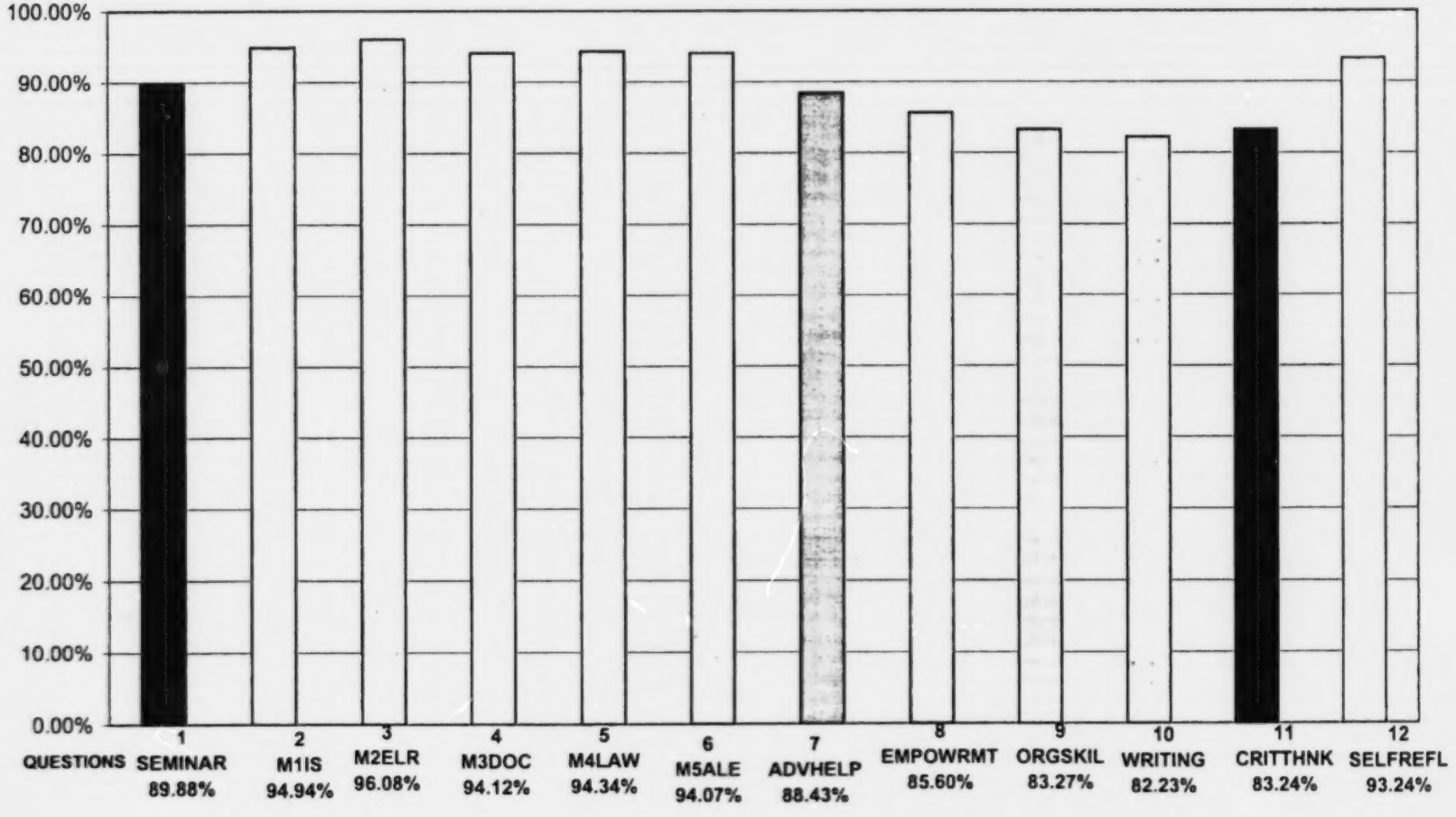
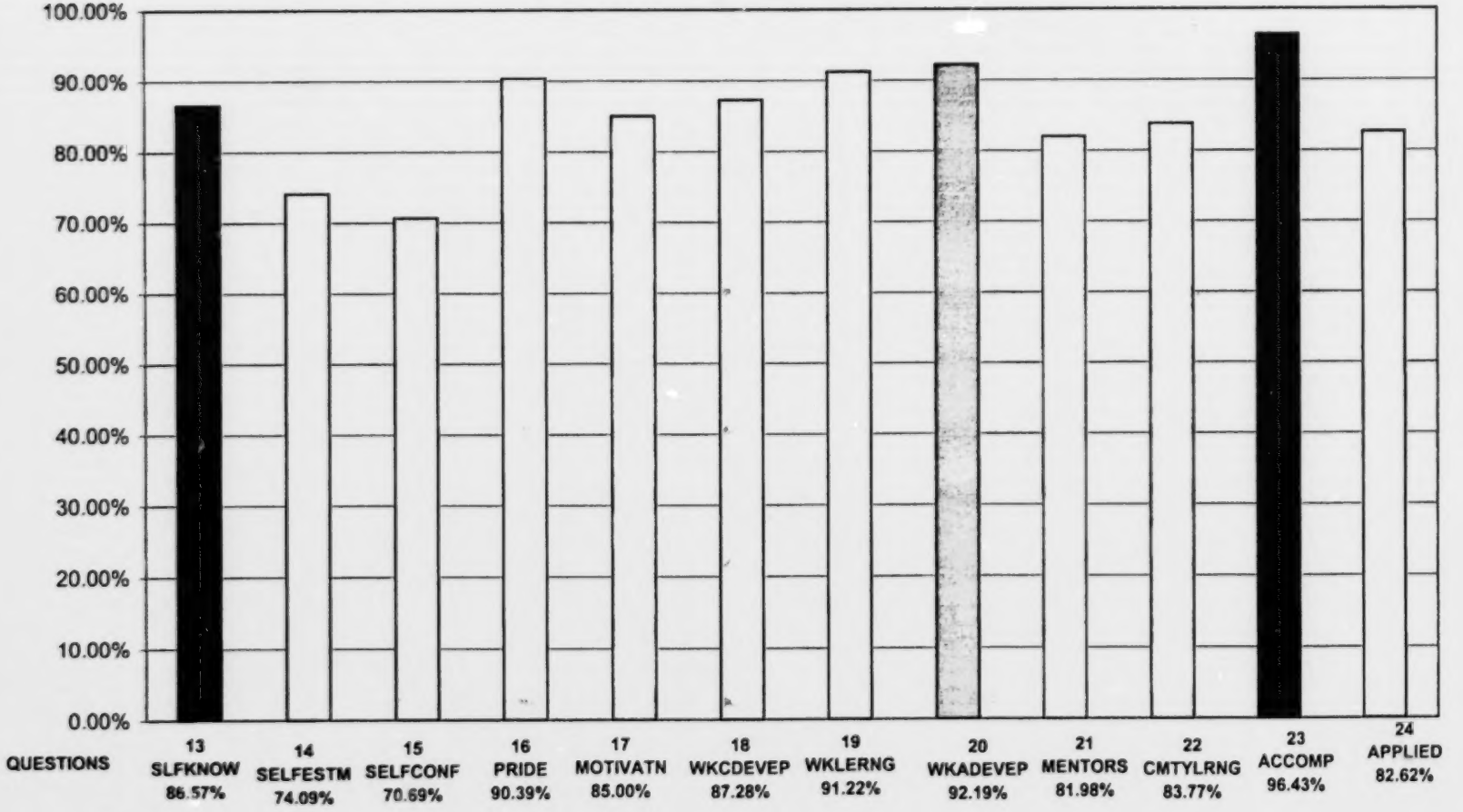
STUDENT SURVEY RESPONSES
STRONGLY AGREED AND AGREED



COMPOSITE RESULTS
SUMMER 2002-SUMMER 2002 (9 TERMS) n=358
STUDENT SURVEY RESPONSES
STRONGLY AGREED AND AGREED



Appendix D

COMPOSITE RESULTS
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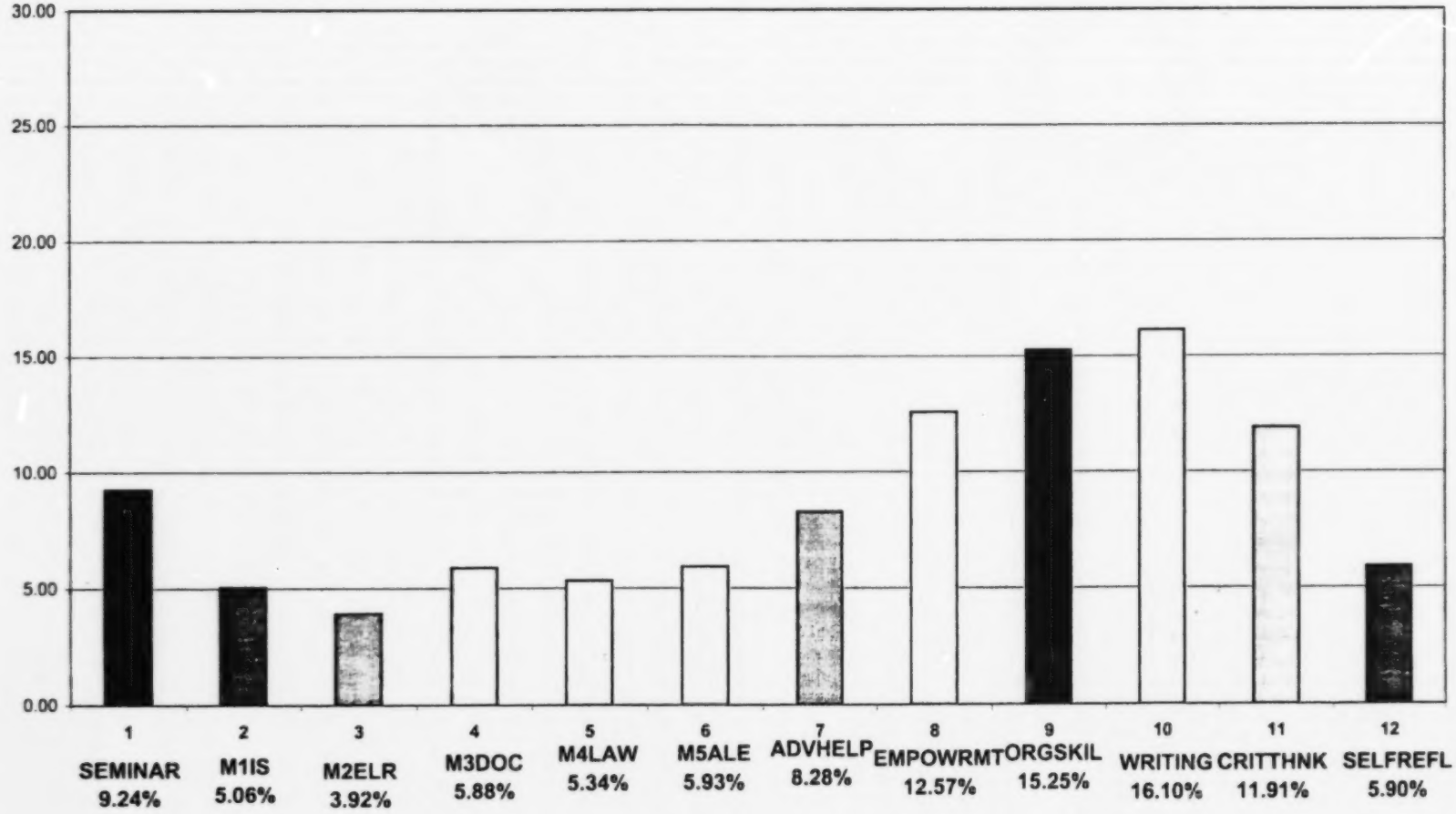
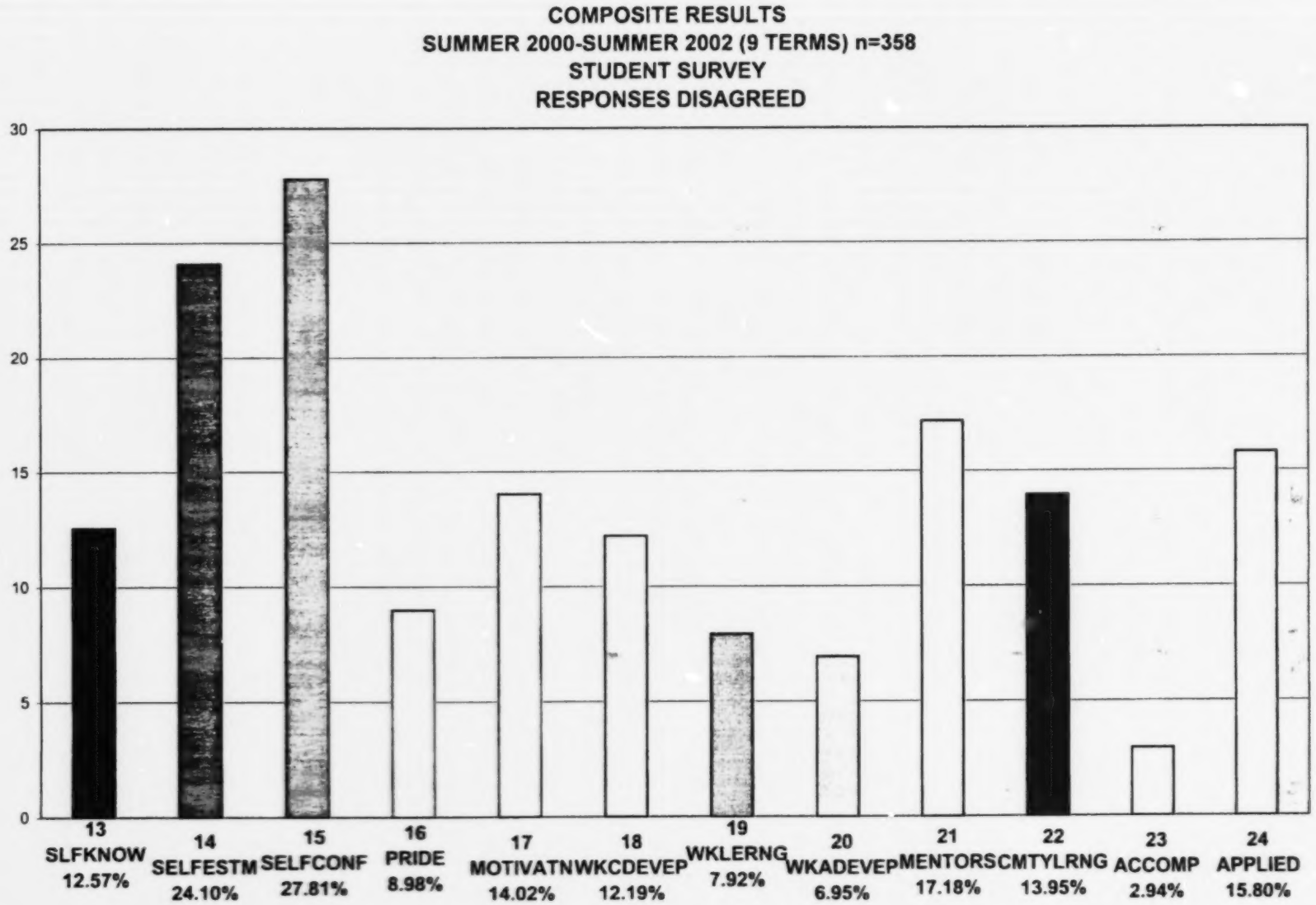
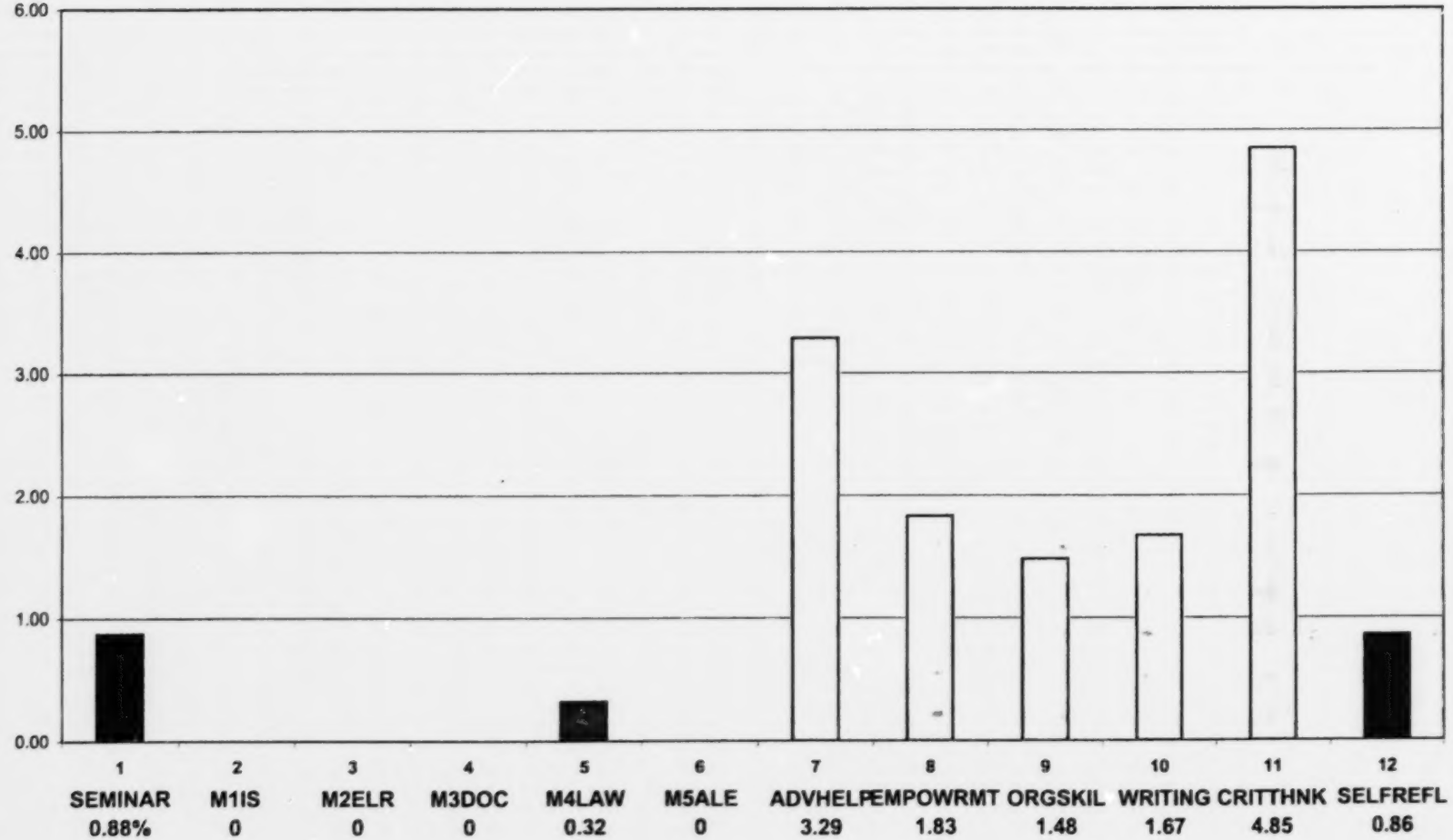
STUDENT SURVEY
RESPONSES DISAGREED

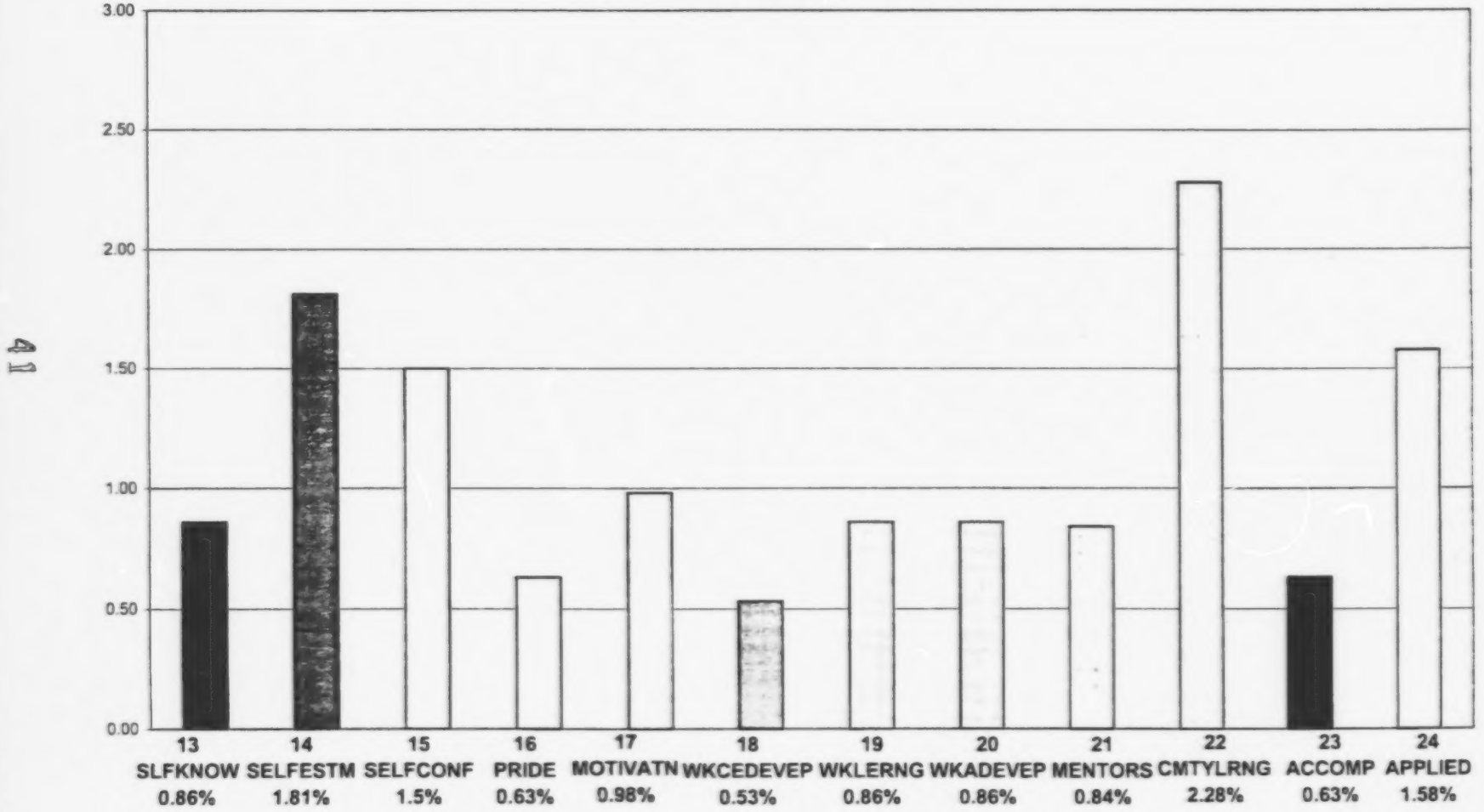



COMPOSITE RESULTS
SUMMER 2000-SUMMER 2002 (9 TERMS) n=358
STUDENT SURVEY
RESPONSES DISAGREED
30
25
20
15
10
5
0
13 SLFKNOW 12.57%
14 SELFESTM 24.10%
15 SELFCONF 27.81%
16 PRIDE 8.98%
17 MOTIVATN 14.02%
18 WKCDEVEP 12.19%
19 WKLERNG 7.92%
20 WKADEVEP 6.95%
21 MENTORS 17.18%
22 CMTYLRNG 13.95%
23 ACCOMP 2.94%
24 APPLIED 15.80%

COMPOSITE RESULTS
SUMMER 2000-SUMMER 2002 (9 TERMS) n=358
STUDENT SURVEY
RESPONSES STRONGLY DISAGREED



COMPOSITE RESULTS
SUMMER 2000-SUMMER 2002 (9 TERMS) n=358
STUDENT SURVEY
RESPONSES STRONGLY DISAGREED



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